

# Farm and Weather Summary

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## Farm Comments

**Field days and tours.** More than 750 people attended 12 field day and farm tour events at the Northeast Research and Demonstration Farm (NERF). Almost 1,200 people visited the Borlaug Learning Center (BLC) and NERF. The BLC hosted 60 events ranging from a three-day agronomist training event to a three-day ag drainage workshop training event. Several livestock and crops extension trainings also were held, along with manure and pesticide applicator license trainings. The summer field day included information on crop weather meteorological predictions and possible implications of the dry weather conditions, an update on the latest research on corn rootworm management, and a discussion on integrated weed management and weed resistance issues. The fall field day included topics on crop markets, as affected by regional drought conditions, interpreting fall soil test results, and potential carry-over nitrogen after a drier crop season. Tile drainage, water management and using annual forages for grazing or feed also were discussed. Tours of field research were held, including two mini field days on the water quality research plots, discussing interseeding perennial ground cover crop mixtures, fall seeded cover crops, and manure management as related to water quality. The ag drainage workshop included a tile drainage installation demonstration on five acres of land.

**New projects.** Corn fungicide application timing studies looking at Tar Spot control, A. Robertson; Corn nitrogen rate x nitrogen fixation product study, ISU NERF; Interseeding multi-species perennial ground cover crops in 60-in. and 30-in. corn spacings, ISU Agricultural and Biosystems Engineering (ABE); Soybean seed treatment study, S. Navi; Biological and insecticide comparison for corn rootworms, A. Gassmann.

## Crop Season Comments

Sump pumps were installed into the 36, one-acre water quality plots March 5 with minimal to no drainage flow through late May. Some limited drainage occurred through mid-June and then drainage stopped until the first substantial rain of the season August 9, when 5 in. of rain caused 15 of the 36 pumps to drain minimal excess water for just one week, before these all quit again. By mid-October, pumps were beginning to drain free water again from 4.5 in. October rainfall, until these were pulled on December 3. This shows how amazing it was the farm produced higher than expected corn and soybean yields, with minimal soil moisture reserves until almost mid-August.

Above normal air temperature (+7.1°F) and below normal precipitation in March (1.38 in.), allowed for March 30 oat and legume seeding. April precipitation (0.63 in. over seven events) allowed early spring field work. Planting began mid-April. On April 1, spring manure injection treatments were applied in water quality plots and preplant nitrogen applications began April 2. In planting date studies, first timings were planted April 5, followed by 19-day planting intervals, ending June 1. The majority of corn and soybean plots were planted starting April 16 and completed May 14. Only two heavy rain events occurred in the growing season of 2021, on August 9 (4.25 in., when just one mile north of the research farm was a band of 7.5 to 10 in.), and August 27 (3.16 in., when some areas northeast of the research farm had over 8 in.). In 2021, the research farm received 26.77 in., (0.97 in. more than 2020).

Corn harvest began October 4 and was completed October 27. Corn yields were above average, which surprised many since the farm received minimal rainfall for the growing season, up until August 9. High yields could be contributed to optimal heat unit accumulation, no heat stress during grain fill, and August rainfall (10.55

in.). Corn grain moisture ranged from 17 to 23%, and yields on rotated acres ranged from 200 to 255 bushels per acre and averaged 220 bushels per acre. Continuous corn yields ranged from 180 to 240 bushels per acre and averaged 210 bushels per acre. Soybean harvest began September 20 and was completed October 16. Minimal sudden death syndrome (SDS) and white mold disease occurred, along with no economic thresholds of soybean aphid populations. Soybean yields ranged from 48 to 80 bushels per acre and averaged 62 bushels per acre. Moisture holding capacity in different soil types caused most of the yield variation, since the farm had below normal rainfall until August 9.

## Weather Comments

**Winter 2020-2021.** The first measurable snowfall occurred November 12, 2020, and the last snow for the season was March 15 with a total of 27.7 in. recorded, 5.3 in. less than the previous winter. The average 4-in. soil temperature remained below 50°F after November 10, 2020, and fall tillage and manure injection operations were completed by November 8. February was the only month where air temperatures were below the 30-year average.

**Spring 2021.** The 4-in. average soil temperature remained above 50°F on April 26. Most farmers completed corn and soybean planting in late April due to below normal precipitation, especially the latter half of April. The last snowfall was March 15 and the last killing frost occurred May 30, which surprised many, since the low temperature was only 33.9°F. Some farmers needed to replant some corn and soybean, especially in no-till or after cover crops, where thick residue allowed emerged corn and soybean to freeze. May had 17 days suitable for field work.

**Summer 2021.** April, May, June, and July rainfall was -3.1, -1.0, -4.1 and -2.0 in. below the 30-year average, respectively, producing some crop stress symptoms during the vegetative growing stages through June when air temperatures were above normal, and into the beginning reproductive stages in July. Corn pollination started about one week earlier than normal (July 15), due to early planting and above normal Growing Degree Unit (GDU) accumulation. The first substantial rain event of the growing season occurred August 9 with 4.25 to 5 in. across the research farm. Total August rainfall was 10.55 in. with minimal tile drainage flow through the entire growing season and also through August, which shows how crucial the August rainfall was to

maintaining normal to above normal grain yields. The GDU accumulation for April through harvest was above normal, allowing crops to mature with minimal artificial drying of corn. Green stems in soybean delayed some soybean harvest, but above normal air temperatures for the latter half of September caused rapid decrease in soybean moisture below the ideal 13% moisture level, causing considerable shatter loss at the soybean head during harvest, leaving many fields 'turning green' from germinating soybean in October due to above normal heat and rain accumulation.

Foliar crop diseases were minimal in corn and soybean, similar to 2020. Tar Spot disease symptoms showed up just before harvest in 2021 (similar to 2020), when corn was already becoming physiological mature with no potential yield loss. Tar Spot showed up earlier in the growing season in states to the east and southeast, causing significant yield reductions due to premature death of the corn plants. Summer heat units accumulation were above normal, which allowed corn to mature prior to frost. Twenty-three days in the growing season had air temperatures at or above 90°F (nine days more than the previous year) with only one day in August during the corn grain fill period.

**Fall 2021.** The first killing freeze occurred October 23 (26°F), 19 days later than 2020. A total of 2,887 heat units were recorded from May through September, about 127 more than the previous year. From April through November, 26.77 in. of rain was recorded, which was 0.97 in. more than 2020 and 4.12 in. less than the 30-year average.

Corn grain moisture during harvest stayed in a narrow range of 16 to 23%, depending on relative maturity of the corn varieties planted. Seven days of rainfall during soybean harvest caused delays, especially since green soybean stems made it hard to thresh with the combine. The 4-in. soil temperature remained below 50°F after October 20, with excellent fall growth of cover crops, either aerially applied or drilled after crop harvest due to plentiful rain in October (4.5 in.) and above normal heat (5.5°F above the 30-year average). Fall manure injection, fall fertilizer applications and tillage operations were completed from November 1-11. Air temperatures were 2.6°F and 6.6°F above the 30-year average, for November and December, respectively.

**Table 1. Monthly growing season rainfall and average temperatures.**

Month	Rainfall, inches			Temperature °F			
	NERF	Departure from normal	Days of rain	NERF	Departure from normal	Growing degree days	Days 90°F+
April	0.63	-3.05	7	49.4	+2.0	202	0
May	3.48	-1.04	13	59.3	-0.03	372	1
June	1.42	-4.05	4	74.7	+5.5	674	12
July	2.53	-2.04	6	73.2	+1.4	687	9
August	10.58	+5.91	10	71.6	+2.0	657	1
September	1.61	-1.95	5	65.8	+3.1	497	0
October	4.50	+1.82	9	55.4	+5.6	278	0
November	2.02	+0.28	4	38.2	+2.6		0
Total	26.77	-4.12	58	1st hard freeze: 29°F October 21			23

\*146 frost-free days

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